

CLAIMS:

1. A composition comprising a purified peptide of a SARS coronavirus S protein, wherein said peptide is capable of modification of SARS coronavirus infectivity.
2. The composition of claim 1 wherein said modification is an inhibition of infectivity.
3. The composition of claim 1 wherein said peptide has a conformational constraint, wherein said constraint enhances an ability to maintain an alpha-helical conformation.
4. The composition of claim 1 wherein said peptide comprises a lactam bridge.
5. The composition of claim 1 wherein said peptide is selected from the group consisting of: SEQ ID NOS: 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 47, 48, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102; and a peptide fragment comprising any continuous 14 amino acids thereof of the foregoing peptides.
6. A composition comprising a purified peptide of a SARS coronavirus S protein, wherein said peptide is capable of modifying an ability of said S protein to form or maintain a conformation relating to fusion or entry in a target cell.
7. A composition comprising a purified peptide HR-N10 (SEQ ID NO:24) or HR-N10a (SEQ ID NO:47).

8. A composition comprising a purified peptide HR-C4 (SEQ ID NO:46) or HR-C4a (SEQ ID NO:48).
9. A composition comprising an alpha-helical trimeric conformation of an HR peptide of a coronavirus spike or fusion protein.
10. A composition comprising an alpha-helical trimeric conformation of a purified HR peptide of a SARS coronavirus S protein.
11. The composition of claim 11 wherein said HR peptide is selected from the group consisting of HR-N10 (SEQ ID NO:24), HR-N10a (SEQ ID NO:47), HR-C4 (SEQ ID NO:46) and HR-C4a (SEQ ID NO:48).
12. The composition of claim 11 wherein said HR peptide is HR-N10 (SEQ ID NO:24) or HR-N10a (SEQ ID NO:47).
13. The composition of claim 11 wherein said HR peptide is HR-C4 (SEQ ID NO:46) or HR-C4a (SEQ ID NO:48).
14. A composition comprising an alpha-helical hetero-trimeric (6-helix) conformation of a purified HR peptide of a coronavirus spike or fusion protein.
15. A composition comprising an alpha-helical hetero-trimeric (6-helix) conformation of a complex comprising a purified HR-N peptide and a purified HR-C peptide of a SARS coronavirus S protein.
16. The composition of claim 15 wherein said HR-N peptide is selected from the group consisting of HR-N1 (SEQ ID NO:6), HR-N2 (SEQ ID NO:8), HR-N10 (SEQ ID NO:24), and HR-N10a (SEQ ID NO:47); and said HR-C peptide is selected from the group consisting of HR-C1 (SEQ ID NO:40), HR-C4 (SEQ ID NO:46), and HR-C4a (SEQ ID NO:48).
17. The composition of claim 15 wherein said HR-N peptide is HR-N10 (SEQ ID NO:24) or HR-N10a (SEQ ID NO:47) and said HR-C peptide is HR-C4 (SEQ ID NO:46) or HR-C4a (SEQ ID NO:48).
18. The composition of claim 16 wherein said HR-N peptide is HR-N10 (SEQ ID NO:24) or HR-N10a (SEQ ID NO:47) and said HR-C peptide is HR-C1 (SEQ ID NO:40).

19. A composition comprising a purified HR-N or HR-C peptide of SARS coronavirus S protein, wherein said peptide is capable of modification of SARS coronavirus infectivity and wherein said peptide has a transition midpoint temperature of from about 35 to about 90 degrees Celsius.
20. The composition of claim 19 wherein said temperature is from about 36 to about 74 degrees Celsius.
21. The composition of claim 19 wherein said temperature is from about 37 to about 60 degrees Celsius.
22. The composition of claim 19 wherein said temperature is from about 56 to about 57 degrees Celsius.
23. A purified peptide comprising at least about 14 contiguous amino acids derived from a peptide selected from the group consisting of: HR-N10 (SEQ ID NO:24), HR-N10a (SEQ ID NO:47), HR-C4 (SEQ ID NO:46), and HR-C4a (SEQ ID NO:48), wherein said peptide exhibits a stable helix conformation at a physiological temperature of a human or other mammal.
24. A composition comprising a purified nucleic acid molecule encoding a peptide of SARS coronavirus S protein, wherein said peptide is capable of modification of SARS coronavirus infectivity.
25. A composition comprising a purified nucleic acid molecule encoding an HR peptide of a SARS coronavirus S protein.
26. A composition comprising a purified nucleic acid molecule capable of encoding a peptide selected from the group consisting of: HR-N10 (SEQ ID NO:24), HR-N10a (SEQ ID NO:47), HR-C4 (SEQ ID NO:46), and HR-C4a (SEQ ID NO:48).
27. A composition comprising a purified nucleic acid molecule capable of encoding peptide HR-N10 (SEQ ID NO:24) or HR-N10a (SEQ ID NO:47).
28. A composition comprising a purified nucleic acid molecule capable of encoding peptide HR-C4 (SEQ ID NO:46) or HR-C4a (SEQ ID NO:48).
29. A method of identifying a peptide composition capable of inhibiting a SARS coronavirus, comprising: providing a peptide of an HR-N or HR-C domain of a

- SARS coronavirus S protein; and measuring an ability of said peptide to inhibit infectivity of a SARS coronavirus or cell fusion in connection with a SARS coronavirus protein; thereby identifying a peptide composition capable of inhibiting a SARS coronavirus.
30. A method of treating a SARS coronavirus infection in a human subject, comprising administering an effective amount of a peptide of a SARS coronavirus S protein.
 31. A method of treating a SARS coronavirus infection in a human subject, comprising administering an effective amount of an antibody reactive towards a material selected from the group consisting of a SARS coronavirus S protein, a peptide of a SARS coronavirus S protein, an HR-N peptide of a SARS coronavirus S protein, an HR-C peptide of a SARS coronavirus S protein, HR-N10, HR-N10a, HR-C4, HR-C4a, HR-C1, a trimeric conformation of a SARS coronavirus peptide, a six helix bundle conformation of a complex of a SARS coronavirus HR-N peptide and an HR-C peptide.
 32. The method of claim 31 wherein said material is HR-N10 or HR-N10a.
 33. The method of claim 31 wherein said material is HR-C4 or HR-C4a.
 34. The method of claim 31 wherein said material comprises an HR-N peptide and an HR-C peptide.
 35. The method of claim 31 wherein said material comprises an HR-N peptide of HR-N10 or HR-N10a and an HR-C peptide of HR-C4 or HR-C4a.
 36. The method of claim 31 wherein said material comprises an HR-N peptide of HR-N10 or HR-N10a and an HR-C peptide of HR-C1.
 37. A SARS coronavirus purified peptide composition capable of stimulating an immune response, wherein said composition is selected from the group consisting of: a SARS coronavirus S protein; a peptide of a SARS coronavirus S protein; an HR-N peptide of a SARS coronavirus S protein; an HR-C peptide of a SARS coronavirus S protein; HR-N10; HR-N10a; HR-C4; HR-C4a; HR-C1; a trimeric conformation of a SARS coronavirus peptide; a six helix bundle conformation of a complex of a SARS coronavirus HR-N peptide

and an HR-C peptide; and a peptide fragment comprising any continuous 14 amino acids thereof of the foregoing peptides.

38. A method of identifying or screening for an inhibitory peptide of a SARS coronavirus, comprising: providing a synthetic or recombinant peptide of HR-N or HR-C; evaluating said peptide for an ability to make a structure selected from the group consisting of an alpha-helical coil, an alpha-helical trimer, and an alpha-helical hetero-trimeric (6-helix) bundle; testing said peptide in an infectivity or cell-cell fusion bioassay, wherein a first result where said peptide is present and demonstrates a reduced infectivity or fusion in comparison with a second result where said peptide is absent; thereby identifying or screening for an inhibitory peptide.
39. The composition of claim 1 wherein said peptide is an HR-N peptide selected from the group consisting of HR-N10 (SEQ ID NO:24) and HR-N10a (SEQ ID NO:47).
40. The composition of claim 1 wherein said peptide is an HR-C peptide selected from the group consisting of HR-C4 (SEQ ID NO:46) and HR-C4a (SEQ ID NO:48).